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**Prepared for:**
**VIRGINIA DEPARTMENT OF TRANSPORTATION**

# Biological Assessment for Bald Eagle Route 624 Bridge Replacement, Cat Point Creek

**State Project: 0624-079-148, C501, B611**
**Richmond County**
**Latitude / Longitude: 37° 59' 02" / 76° 48' 35"**

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## EXECUTIVE SUMMARY

The Virginia Department of Transportation (VDOT) proposes to replace the existing Route 624 bridge across Cat Point Creek in Richmond County, VA. During permit coordination, the Virginia Department of Game and Inland Fisheries (VDGIF) and the U.S. Fish and Wildlife Service (USFWS) identified Cat Point Creek as a bald eagle (*Haliaeetus leucocephalus*) breeding and concentration area, subject to their review. The purpose of this document is to provide a biological assessment of the potential impacts of the proposed bridge project on bald eagle populations utilizing Cat Point Creek.

Cat Point Creek is one of the most pristine tributaries within the tidal-fresh reach of the Rappahannock River, a body of water that is known to be a core conservation area for the bald eagle and that has been targeted by Virginia as a significant management area for the species. In recent years, this creek has become increasingly important to three populations of bald eagles including 1) the Chesapeake Bay breeding population, 2) the southeastern breeding population that migrates up to the Bay to spend the summer months, and 3) the northeastern breeding population that migrates down to the Bay to spend the winter months.

All available information was evaluated to determine the likelihood that the proposed construction project would impact bald eagle populations that utilize Cat Point Creek. In early 2006, Cat Point Creek is believed to support 8 active bald eagle nests and 2 known communal roosts. The bridge project is outside the management buffers for all known nests and roost areas and so, under Virginia management guidelines, is not subject to activity or time-of-year restrictions based on nests and roosts. Cat Point Creek and the Route 624 bridge are within the Rappahannock River Summer Bald Eagle Concentration Area. However, there are no shoreline segments along the creek currently delineated as high-use for eagles during the summer period due to the lack of survey information. For this reason, the bridge does not fall within any ¼ mile buffer of a high-use shoreline and the construction project is not expected to impact over-summering eagles, nor is it subject to current management guidelines due to over-summering birds. Cat Point Creek and the Route 624 bridge are within the Rappahannock River Winter Bald Eagle Concentration Area. In recent years, the east shoreline above and below the bridge has been documented as one of the highest use shorelines within the concentration area. Under current Virginia guidelines, the bridge project is subject to time-of-year restrictions from 1 November through 28 February.

The proposed bridge design will raise the height of the bridge from its current level of 4 feet to 10 feet above mean high water. This proposed increase in clearance will open the upper reach of the creek to increased boat traffic. However, current Virginia management guidelines to not apply to this scenario with regard to eagle nests or communal roosts. In addition, the shoreline above the Route 624 bridge has not been delineated as a high-use shoreline for either winter or summer due to the lack of survey information such that current guidelines do not restrict this action based on identified foraging areas for migrant birds.

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# 1.0 INTRODUCTION

## 1.1 Purpose

This biological assessment was prepared to evaluate potential effects on the federally listed bald eagle resulting directly from construction of a new bridge and indirectly from a change in the bridge vertical clearance. The Route 624 bridge in Richmond County was built in the 1930s and provides residents with passage across the upper reach of Cat Point Creek. The bridge has deteriorated over the years and has a very low sufficiency rating. The Virginia Department of Transportation (VDOT) has proposed to replace the bridge and bring the crossing up to current standards.

## 1.2 Agency Coordination

As part of the State Environmental Review Process, it was determined that there was a bald eagle nest within 2 miles of the proposed bridge project. VDOT conducted a field review with VDGIF and determined that the nearest nest was ¾ of a mile from the project. On 8 September, 2004, in a message to VDOT the USFWS indicated that the nearest bald eagle nest to the project was ¾ mile away and that the project should have no effect on the eagle. On 29 September, 2004 the Federal Highway Administration in a letter to USFWS indicated their belief based on preliminary agency review that the project would not likely adversely affect the bald eagle and that formal section 7 consultation would not be necessary. The Route 624 bridge project was presented for early coordination during a coordination meeting on 14 June, 2005 and for permit coordination on 9 August, 2005. During the coordination meeting, VDGIF indicated the possibility of a bald eagle nest site within the vicinity of the proposed project but there was no mention that the project area was within a designated concentration area for bald eagles. Upon receipt of project proposal in June 2005, the U.S. Fish and Wildlife Service (USFWS) requested a 30-day extension to be able to review potential impacts of an elevated bridge on the use of the upper reach of Cat Point Creek by the federally listed threatened bald eagle. On 11 July, 2005, the USFWS requested a comment extension until 27 July, 2005. On July 25, 2005 USFWS provided comments that the service was concerned that a heightened bridge could result in increased boating activity in that portion of Cat Point Creek upstream of the existing bridge. The USFWS requested a 30 day extension, until 27 August, 2005, to allow time to resolve these issues. On 9 August, 2005, VDGIF provided the preliminary comment (pending the interagency field review and coordination with agency experts) that the project was within a bald eagle concentration area and recommended time-of-year restrictions from 1 May through 30 September and from 1 November through 28 February. In comments from the 9 August, 2005 coordination meeting (received by VDOT on 7 September, 2005), USFWS indicated for the first time that the project fell within a bald eagle concentration area. An interagency field review was conducted on 9 September, 2005 to evaluate concerns regarding bald eagles. VDOT indicated that 1 November through 28 February and 1 May through 30 September restrictions were too restrictive and requested reconsideration from the agencies. On 26 September, 2005, USFWS sent comments resulting from the 9 September field review and requested a time-of-day restriction, limiting construction to hours between 10:00 AM and 4:00 PM between the dates of 15 May to 15 September and 1 December to 28 February. Additionally, USFWS requested that

the new bridge maintain the same height above mean low water as the existing bridge to maintain the current level of boat traffic.

## 1.3 Project Description

This project involves the replacement of the bridge over Cat Point Creek on Route 624, Newland Road, in Richmond County (Figure 1). The existing two-lane bridge was built in the 1930s and does not meet current geometric standards. The steel beams have rusted completely through in some places and the eastern ends of the beams are under water at high tide. The original swing span was approved for closure on 30 April, 1954 by the Corps of Engineers. The span has been welded shut for many years and has a wooden deck that requires frequent maintenance. The footings of Pier 5 are undermined, exposing four timber piles. The sufficiency rating for the bridge is 6 on a scale of 1 to 100. The bridge's load limit is 15 tons, though that limit is expected to be lowered in the near future. Clearance above mean high tide for the existing bridge is approximately 4 feet at midspan.

The proposed replacement span will have two 12-foot lanes, with eight-foot shoulders, meeting current geometric standards. The new bridge will extend completely across the creek rather than ending on a causeway. It will be built adjacent to the north side of the existing bridge (upstream) as this was determined to have the least wetland impact. The proposed bridge consists of ten 81'-6" prestressed concrete 45" deep bulb-t spans continuous for live load. The proposed bridge is jointless utilizing semi-integral abutments at the ends and 24" pile bents at the interior supports.

The proposed profile results in approximately 7 feet of clearance above mean high tide on the north side of the channel and approximately 10 feet of clearance on the south side of the channel (approximately matching the clearance of the Route 634 bridge at the mouth of Cat Point Creek). The elevation of the bottom of girder at the abutment side was set at the design (100-year) flood elevation keeping the bridge superstructure out of the design flood plain and providing sufficient clearance for inspecting the bridge seats at the abutment. The proposed grade reduces the amount of fill, reduces the height/length of the retaining wall and minimizes the effects to the property at the end of the bridge. Clearance above mean high tide for the existing bridge is approximately 4 feet at midspan.

**1.3.1 Construction Activities and Times** – Replacement of the Route 624 bridge will be accomplished in phases and will require several months to complete (Table 1). Some of this work may be accomplished concurrently where appropriate.

**Table 1.** Cat Point Creek - 0624-079-148, C501, B611 construction activities and time frames.

| | |
|---|---|
| Access to Abutments A & B | |
| • Clear and grub on new alignment to abutment A | 3 weeks |
| • Install fill to abutment A for equipment access | 6 weeks |
| • Install temp. work bridge | 3 weeks |
| **Approximate time frame to establish Access to Abutments/Bents** | **3 months** |
| | |
| Substructure | |
| • Drive sheetpiling at abutments A & B | 2 @ 4 days |
| • Trench widen existing pavement at abutment B | 3 days |
| • Excavate at abutment A & B | 2 @ 2 days |
| • Drive test piles for abutments and for bents | 2 @ 3 days |
| • Drive piles for abutment A and abutment B – 26 piles each | 2 @ 6 days |
| • Drive piles for each bent – 9 bents, 7 piles each | 9 @ 2 days |
| • Form and install reinforcing steel in pile caps for each bent | 9 @ 3 days |
| • Place concrete in each pile cap for each bent | 9 @ 3 days |
| • Form and install reinforcing steel in footing for each abutment | 2 @ 3 days |
| • Place concrete in each footing for each abutment | 2 @ 3 days |
| • Form and install reinforcing steel in backwalls for each abutment | 2 @ 3 days |
| • Place concrete in backwalls for each abutment | 2 @ 4 days |
| • Set girders | 10 @ 5 days |
| **Approximate time frame to perform Substructure work** | **8 months** |
| | |
| Road Work | |
| • Construct approaches to abutments | 5 days |
| • Build pavement structure in new alignment | 5 days |
| • Tie in to existing pavement | 1 day |
| • Clean ditches | 3 days |
| • Install guardrail and signs | 2 days |
| • Shift traffic to 1 lane on old and 1 lane on new alignment | 1 day |
| • Pull sheet piling | 4 days |
| • Construction remaining fill slope at abutments A & B | 4 days |
| • Switch all traffic to new alignment | 1 day |
| **Approximate time frame to perform Road Work** | **3 weeks** |
| | |
| Demolition and Clean up | |
| • Remove old structure | 6 weeks |
| • Remove old pavement | 2 weeks |
| • Construct mitigation site including plantings | 1 week |
| **Approximate time frame to perform Demolition and Clean** | **2 months** |

### 1.3.2 Evaluation of Plan Modifications

VDOT has considered modifications to the bridge plan as requested by USFWS. In considering plan modifications, it is important to keep in mind the rationale behind the proposed design. As currently designed, the bridge provides approximately seven feet of clearance above mean high tide on the north side of the channel and 10 feet of clearance on the opposite side of the channel, which is consistent with clearance on the bridge at the mouth of Cat Point Creek. This design sets the bottom of the girder at the northern abutment above the design (100 year) flood elevation and keeps the bridge superstructure out of the design flood plain. Additionally, this provides sufficient clearance for inspecting the bridge beams over the channel and allows inspection of the structure from the bridge deck over both the water and wetlands. These considerations minimize, to the greatest extent practicable, the amount of fill, the height/length of the retaining wall and the effects to the property at the end of the bridge due to the negative grade.

VDOT has considered two options in an attempt to address the FWS's request that they modify the effective opening of the bridge: 1) lowering the height of the proposed bridge and 2) restricting clearance by artificial means. These options are further subdivided into two additional options. These options are discussed in detail below.

**Lowering Bridge Height**

*Revising the profile to maintain the existing clearance above mean high tide (approximately 4 feet)* - This option would result in a significant portion of the bridge superstructure falling below the design flood elevation, which would expose structural components (such as steel bearings) to inundation and would require additional long-term maintenance due to flooding and debris removal. The superstructure would act as an obstruction, reducing the hydraulic opening and subjecting itself to additional force. There would be insufficient room to adequately inspect the bridge and placement of bent caps may require cofferdams to allow construction in the dry, which would increase VDOT's estimate of construction time.

The current proposal is a jointless design that contracts and expands from its center under temperature and creep loading from its center. At fixed bents, movement is accommodated by bent deflection. At expansion bents, movement is accommodated by a combination of bearing pad distortion and bent deflection. To accommodate the movement at the abutments, elastomeric bearings with a PTFE sliding surface are used. Under this option, the additional force, potential for debris entrapment and inundation of the bearing areas, could affect bearing alignment and proper functioning under temperature loading. In particular, the PTFE sliding surface at the abutments would be jeopardized. A change in concept where joints were added to the bridge could be required.

*Revising the profile to reduce the clearance above mean high tide by keeping the superstructure out of the design floodplain and the grade relatively flat over the channel* - This option would result in approximately 6 feet of clearance above mean high tide on

the northern side of the channel and approximately 7 foot clear on the other side, which would not provide sufficient room to inspect the bridge over the wetland. Since the profile elevation would remain relatively the same at the end of the bridge and the grade would now be relatively flat, this option would increase fill quantities, height/length of the retaining wall and increase the effect on the property at the end of the bridge.

Any change to the plans that affect this property would require VDOT to completely renegotiate with the property owner since the deeds have been signed and recorded. Renegotiation may result in additional time and expense, and possibly condemnation.

**Restricting Clearance**

*Restricting clearance by artificial means by hanging an obstruction from the bridge superstructure* - This option would increase debris entrapment, which would transfer additional force to the bridge during inundation and increase long-term maintenance due to debris removal and repair of damaged components. Suspension of a restriction would unnecessarily complicate inspection of the bridge due to potential interference with inspection equipment and would present a safety and liability issue for VDOT. Lastly design of an attachment, investigation of its impacts to the bridge structure and installation would require additional time and would increase bridge costs by approximately $60,000.

*Restricting clearance by artificial means by supporting an obstruction across the channel independent of the bridge* - This option involves the same issues as the preceding option, but does not result in the transfer of additional forces to the bridge. This is estimated increase initial project costs by $93,000.

## 2.0 FEDERALLY LISTED SPECIES - BALD EAGLE (*HALIAEETUS LEUCOCEPHALUS*)

### 2.0.1 Legal Status (Bald Eagle)

USFWS originally listed the bald eagle as federally endangered on 11 March 1967 under The Endangered Species Protection Act of 1966 (16 U.S.C. 668aa-668cc) and subsequently under The Endangered Species Act of 1973 (16 U.S.C. 1531 et seq). The primary reason cited for the original listing was broad-scale population declines linked to dichloro-dephenyl-trichloroethane (DDT) and associated reproductive failure. On December 31, 1972, DDT was banned from use in the United States. Since the ban on DDT and formal listing under The Endangered Species Act, bald eagle populations have increased dramatically across much of the lower 48 states. During a periodic population review, USFWS determined that specific reclassification goals had been reached as outlined in regional recovery plans. On 12 July, 1994, USFWS published the proposed rule to reclassify the bald eagle from endangered to threatened in most of the lower 48 states (59 FR 35584). This proposal was followed on 12 July 1995 by the formal downlisting of most bald eagle populations (60 FR 36000). The bald eagle population in

the lower 48 states has increased from an estimated low in 1963 of 417 pairs (Sprunt 1963) to an estimated 5,748 pairs by 1998 (Millar 1999). On 6 July, 1999, USFWS published an Advance Notice of an intent to remove the bald eagle from the list of endangered and threatened wildlife (64 FR 36453). No further action was taken until 16 February, 2006 when the service published a reopening of the public comment period on the intent to remove the bald eagle from the federal endangered species list (71 FR 8238). The comment period terminates on 16 May, 2006 leading to a period of response and deliberation for delisting. The proposed federal action will likely have no bearing on this project 1) because this process is likely to be concluded before even the most optimistic schedule for delisting, and 2) because under the current delisting plan, the Bald and Golden Eagle Act will become the lead legislation protecting bald eagles and the interpretation of that act presented by USFWS is consistent with current management guidelines.

### 2.0.2 Regulations Protecting Bald Eagles

Federal Laws - There are four federal laws that provide direct protection for bald eagles including: 1) The Lacey Act, 2) The Migratory Bird Treaty Act, 3) The Bald and Golden Eagle Protection Act, and 4) The Endangered Species Act. However, for the past 35 years, the lead legislation protecting eagles has been The Endangered Species Act with secondary legislation being the Bald and Golden Eagle Protection Act.

The Endangered Species Act of 1973 (16 U.S.C. 1531-1543; 87 Stat. 884) as amended, provides for the conservation of "endangered" and "threatened" species of fish, wildlife, and plants by federal action. It prohibits the unauthorized "taking", possession, sale, transport, import, export, delivery, or receiving of any threatened or endangered species. The Act defines an endangered species as a species that is in danger of extinction throughout all or a significant portion of its range. The Act contains recovery, as well as listing and protection, provisions. The Act defines "taking" as "to pursue, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb".

The Bald and Golden Eagle Protection Act of 1940 (16 U.S.C. 668-668d; 54 Stat. 250) as amended, prohibits anyone from "taking", possessing, selling, purchasing, bartering, offering for sell, transporting, exporting, or importing at any time or in any manner, any Bald or Golden Eagle, alive or dead, or any part, nest, or egg except as specified in the Act. The Act defines "taking" as "to pursue, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb".

Virginia Laws – There are three pieces of Virginia legislation that are pertinent to Bald Eagle management in Virginia including 1) Virginia's Endangered Species Act, 2) Federal Endangered Species Act Cooperative Agreement, and 3) State Protection of Wildlife Species.

Virginia's Endangered Species Act (§29.1-563 - §29.1-570) – This law provides that VDGIF is the state regulatory authority over federally or state listed endangered or threatened fish and wildlife in the Commonwealth, defining *fish or wildlife* as "*. . . any*

*member of the animal kingdom, vertebrate or invertebrate, except for the class Insecta, and includes any part, products, egg, or the dead body or parts thereof.*" It prohibits the taking, transportation, processing, sale, or offer for sale within the Commonwealth of any fish or wildlife listed as a federally endangered or threatened species, except as permitted by the Board of Game and Inland Fisheries for zoological, educational, scientific, or captive propagation for preservation purposes.

The Act further authorizes the Board to adopt the federal list of endangered and threatened species, to declare by regulation that species not listed by the federal government are endangered or threatened in Virginia, and to prohibit by regulation the taking, transportation, processing, sale, or offer for sale of those species. Implementing regulations passed pursuant to this authority (4 VAC 15-20-130 through 140) further define "take" and other terms similarly to the federal Endangered Species Act.

Federal Endangered Species Act Cooperative Agreement – Federally listed endangered or threatened species also are placed under VDGIF jurisdiction via a cooperative agreement signed in 1976 with the USFWS pursuant to Section 6 of the ESA. This Cooperative Agreement recognizes VDGIF as the Virginia agency with regulatory and management authority over federally listed or threatened animals excluding insects, and provides for federal/state cooperation regarding the protection and management of those species.

State Protection of Wildlife Species – In addition to these endangered species laws, regulations, and cooperative agreement, the Code of Virginia (§29.1-521) and VDGIF regulations (4 VAC 15-30-10) provide legal protection to all native birds and to their nests, eggs, and young.

### 2.0.3 Bald Eagle Ecological Requirements

Breeding Habitat - Bald Eagles nest adjacent to or in the vicinity of large bodies of water. In the Chesapeake Bay region, eagles are known to nest along the ocean, inland bays, and reservoirs but the majority (>90%) nest along the shoreline of the Chesapeake Bay and its major tributaries. An examination of 367 historic nests in Virginia showed that greater than 95% of the nests were within 3 km of a channel at least 250 m wide and approximately 60% fall within 1 km of these waterways (Watts et al. 1994a). This strong association with large waterways implies that the vast majority of habitats that support the current breeding population are contained within the narrow ribbon of land along the Chesapeake Bay shoreline.

Eagles within the Bay tend to nest in remote areas away from human development (e.g. Andrew and Mosher 1982). In Virginia, the density of buildings and secondary roads is one of the best predictors of eagle nest distribution with densities being very low directly around nests compared to background densities. For 131 active nests that were examined in 1992, none had greater than 5 houses within 200 m or greater than 10 houses within 400 m (Watts et al. 1994a). In recent years, there has been an increasing number of eagle pairs nesting in close proximity to human activity.

Nesting Substrate - Because eagles build large nests, they require large trees for nesting substrate. Due to their long wingspans, eagles typically choose large trees where they have direct flight access to the nest position. Nest trees are generally the largest trees in a woodlot, often towering over the surroundings and allowing the adult birds easy access to the nest. Under extreme circumstances, lack of available nesting substrate may limit nesting distribution (Hodges 1982). Because of their dual requirement for large trees and crown access, the actual relationship between eagle distribution and forest cover may be influenced by many factors (e.g. topography, landscape structure, forest composition). However, having trees substantial enough to support nests appears to be critical. An investigation of factors contributing to nest distribution in the lower Bay showed that landscapes surrounding eagle nests were significantly different from locations chosen randomly with respect to forest cover (Watts et al. 1994). On average, the land within 200 m of nests supported four times more mature forest than land surrounding random locations, suggesting that eagles do respond to the distribution of mature forests when selecting territory locations.

Nesting Season - Within the Chesapeake Bay, Bald Eagle pairs typically remain on or near their breeding territories throughout the year (Buehler et al. 1991a). Nest building and repair begins in October and peaks in mid-winter but may be observed during any month of the year (Fraser et al. 1991). Courtship flights and related behavior are most frequently observed during January and February and eggs are typically laid between mid-January and late February (outer ranges are mid-December through April). There is latitudinal variation in dates of clutch initiation with pairs on the James River laying 4-6 days earlier than pairs on the Potomac River (Watts unpublished data). Clutches vary in size between 1 and 3 eggs and are incubated by both sexes for 35 days. Most eggs hatch between early March and early May and eaglets remain in the nest for 11 to 12 weeks (Byrd et al. 1990).

Prey Use - Bald Eagle diet varies seasonally according to prey availability and energetic demand. Throughout most of the Bay, diet appears to be dominated by fish during the summer months. During the brood-rearing period, eagle diet in the lower portion of the Chesapeake Bay is dominated (>95%) by fish (Wallin 1982, Markham 2004, Watts et al. 2004). In a recent intensive investigation (N = 730 identified prey) of prey delivered to nests, fish constituted 96.0% of prey, mammals 2.3%, reptiles 1.2% and birds 0.5% (Markham 2004). Catfish (*Ictalurus spp.*) and Clupeids (shad and herring) were the dominant prey groups accounting for more than 70% of all prey items identified. Although not as well documented, there is some evidence that diet during the brood rearing period on the lower Delmarva Peninsula has a much greater avian component (Cline 1985, Watts personal observation). Although they represent a relatively small portion of the overall diet, the use of turtles as prey is widespread throughout the Bay (Cline and Clarke 1982, Therres, personal observation). Collections of turtle shells from nests between 1977 and 1981 suggested that diamondback terrapins (*Malaclemys terrapin*) and musk turtles (*Sternotherus odoratus*) were the most frequently used species with eastern mud turtle (*Kinosternon subrubrum*), snapping turtle (*Chelydra serpentine*) and eastern box turtle (*Terrapene Carolina*) also represented. Working in the upper Bay,

Mersmann (1989) showed that non-breeding eagles primarily used gizzard shad (*Dorosoma cepedianum*), channel catfish (*Ictalurus punctatus*), American eel (*Anguilla rostrata*), and Atlantic menhaden (*Brevoortia tyrannus*) during the summer and further that these species were the most abundant in gill-net samples. Observations of over-summering eagles within the James River concentration area suggest that the diet is predominately fish (100% of 221 prey items) (Watts and Whalen 1997).

During the late fall and winter, Bald Eagles in the Bay exhibit a dietary shift to more birds and mammals. This shift appears to reflect a reduction in the availability of fish in shallow-water foraging areas and the movement of winter-resident birds (primarily waterfowl and gulls) into the estuary (Mersmann 1989). DeLong et al. (1989) assessed prey availability with gillnet sampling and found that fish numbers in the upper Bay declined seasonally November through March while waterfowl abundances peaked in winter months until April. Haines (1988) collected prey remains under communal roosts on the upper tidal Potomac and found that birds represent a considerable portion of the diet during the winter months. This is consistent with analysis of pellets from several roost locations within the upper Bay during a similar time period (Mersmann 1989). The diverse assemblage of bird remains collected from nests during the 1980's throughout the Bay likely reflect prey taken in late winter rather than during the spring brooding period (Cline 1985).

### 2.0.4 Human Disturbance and Bald Eagles

Human activity is the best predictor of eagle distribution within the Chesapeake Bay. Indicators of human activity such as housing and road density, shoreline use, and boating activity have been related to nest distribution (Watts et al. 1994), shoreline use (Buehler et al. 1991b, Watts and Whelan 1997), and the likelihood of nest abandonment (Therres et al. 1993) or recolonization (Watts, unpublished data).

Legal Definitions – Section 9 of the Endangered Species Act, together with implementing rules, bars any person (or federal agency) from "taking" endangered or threatened wildlife. The term "take" is defined by the act to include "harming" a listed species. "Harm," in turn, is defined by FWS to include indirect harm by means of certain habitat alterations. Harm in the definition of "take" in the Act means an act which actually kills or injures wildlife. Such act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering.
Under The Bald and Golden Eagle Protection Act, Congress provided broad prohibition in its definition of "take" to include; pursue, shoot, shoot at, wound, kill, capture, trap, collect, molest, or disturb. The working definition of "disturb" used to apply both of these laws is to agitate or bother to the degree that interferes with or interrupts normal breeding, feeding, or sheltering habits, causing injury, death, or nest abandonment.

Nesting Areas – During particular stages of the nesting cycle Bald Eagles are very sensitive to human disturbance around nest sites. Depending on the specific site and pair, even minor disturbance may cause a loss of feeding opportunity, loss of eggs or small

chicks due to exposure, or complete abandonment. Construction activity has been shown to adversely impact bald eagles during the breeding season within the Chesapeake Bay (Therres et al. 1993, Watts, pers. Obs.). Human disturbance and activities associated with construction have been shown to cause nest abandonment, nest failure, and/or loss of foraging opportunities. Disturbance that occurs with enough frequency to keep adults off the nest and prevent them from regulating the temperature of eggs or small chicks or from providing enough food to the brood to allow them to thrive, may cause complete abandonment of the site. Activity around nest sites is regulated by the Virginia Bald Eagle Management Guidelines. Violations of these guidelines that result in a "taking" are subject to prosecution under appropriate federal and state laws.

Shoreline Areas - Eagles foraging along the shoreline are very susceptible to human disturbance within the immediate uplands and within approximately 200 m of the associated waterway. An intensive study of eagle-boat interactions including 2,674 observations within the James River Concentration Area and 770 observations within the Rappahannock River Concentration Area showed that the probability of a bird flushing from the shoreline increased as a boat approached (Watts and Whalen 1997, Watts 1998). Flushing probabilities were less than 5% beyond 300m, increased to more than 20% as the boat reached 200 m, 45% as the boat reached 150 m, nearly 80% as the boat reached 100 m, and 90% as the boat reached 50 m. The same studies examined the influence of boat distribution on shoreline use by eagles by comparing shoreline segments that had boats within 200 m at the time of survey with those that did not. Shoreline segments that had associated boats had a significantly lower probability of having perched eagles. Within both Bald Eagle concentration areas, both boat traffic and the number of shoreline segments impacted (no eagle use) by boats were significantly higher on weekends compared to week days. The number of eagles detected within the entire concentration area for both rivers was significantly lower on weekends and holidays compared to week days. Human activity in the surrounding uplands (within 100 m of the shoreline) has a significant effect on shoreline use by eagles. A comparison of shoreline use by eagles within both the James and Rappahannock River Bald Eagle Concentration Areas showed that just 1 person in the uplands had a significant negative influence on eagle use (Watts and Whalen 1997, Watts 1998).

Because Bald Eagles avoid contact with humans, consistent human activity may prevent eagles from using locations. For this reason, chronic (daily) human disturbance within potential foraging habitat will effectively render those areas unsuitable and prevent eagles from accessing prey populations. Four independent studies of eagle distribution within Chesapeake Bay concentration areas showed that human distribution was the best predictor of the distribution of foraging eagles (Buehler et al. 1991, Clark 1992, Watts and Whalen 1997, Watts 1998). Eagles avoided shoreline segments with housing developments, piers, boat ramps, and other shoreline access points. Over time, the loss of access to the prey resources associated with human-impacted shorelines serves to reduce the capacity of the area to support eagles and the population will decline to a new equilibrium with the remaining landscape. For non-breeding birds, this loss will result in a reduction in use of both the shoreline and associated communal roosts as birds are forced to focus activities in other areas. This represents a loss of foraging habitat for

migrant populations during the non-breeding period of their annual cycle. For breeding birds, this loss may result in nest failure and ultimately in territory abandonment, potentially leading to a reduction in the local breeding population.

The immediate consequence of flushing birds from foraging areas is the loss of foraging opportunity. For non-breeding birds, loss of foraging opportunity may have an impact on their daily energy budget. However, non-breeding birds are not tied to specific foraging areas and so, in most situations, would be able to compensate for losses by moving to alternate foraging locations. It is unlikely under normal circumstances that this disruption in foraging would reduce survivorship in non-breeding eagles. For breeding birds with chicks, loss of foraging time within the feeding territory may result in a decline in brood provisioning that may result in brood reduction or complete failure depending on the severity of the energy shortage.

## 2.1 Breeding Population

### 2.1.1 Chesapeake Bay

**Federal Recovery Plan** – To facilitate the recovery of the bald eagle, USFWS divided the lower 48 states into 5 recovery regions. The Chesapeake Bay (including portions of Virginia, Maryland, West Virginia, Pennsylvania, Delaware, and New Jersey) is one of these recovery units. The Chesapeake Bay Bald Eagle Recovery Team completed its first recovery plan in 1982 with a first revision in 1990 (Byrd et al. 1990). The plan outlines biological thresholds for federal "downlisting" as a sustained nesting population of 175-200 pairs, with a productivity rate of 1.1 chicks/breeding attempt. The biological threshold for full recovery necessary for "delisting" included a nesting population of 300-400 pairs with an average productivity of 1.1 chick/breeding attempt sustained over 5 years.

**Population History** – No specific estimates of the Chesapeake Bay bald eagle population are available prior to the early 1900s. However, given the high productivity of Bay waters and the availability of extensive shallow-water foraging areas, it has been speculated that prior to European settlement the Chesapeake Bay may have supported one of the densest breeding populations of bald eagles outside of Alaska. By applying breeding densities from Alaska to the 13,000 km of Chesapeake shoreline, Fraser et al. (1991) suggest that the pristine Chesapeake may have supported in excess of 3,000 breeding pairs of bald eagles. A more recent investigation (Watts et al. In Press(a)) shows significant spatial variation in colonization rates and breeding density that suggests carrying capacity varies throughout the Bay. One implication of these results is that the initial carrying capacity of the Bay may have been approximately half of that projected by the Fraser et al. (1991) study.

The first recorded survey of bald eagles in the Chesapeake Bay was a ground survey conducted by Bryant Tyrell in 1936 (Tyrrell 1936). His survey covered approximately 25% of the available habitat within which he estimated 150-200 nesting pairs. This

survey has been used to project that the Chesapeake Bay population was between 600 and 800 breeding pairs at this time (Abbott 1978, Byrd et al. 1990).

A decline in the Chesapeake Bay bald eagle population was evident to the ornithological community by the mid-1950s. The first aerial survey of eagle nests in the Chesapeake Bay was conducted in 1962 (Abbott 1963). The survey included approximately twice the land area covered by Tyrell in 1936. Survey results suggested that about 150 breeding pairs of eagles remained in the Chesapeake Bay in 1962. Annual aerial surveys continued to document a decline until the population reached an estimated low of 30-40 pairs in 1970 (Abbott 1978).

**Population Recovery** – From 1977 to the present, government agencies, conservation organizations, and researchers have collaborated to survey the Chesapeake Bay population. Population growth has been exponential over this time period with an overall ten-fold increase in breeding pairs. Annual aerial surveys began to reveal a gradual recovery of the bald eagle population in the late 1970s. By 1985, the Chesapeake Bay supported more than 125 eagle territories. By 1994, this number had increased to more than 300 territories. In 2003, the population included 773 occupied territories in Virginia and Maryland combined (Watts and Byrd 2003, Therres unpublished data). This increase has been exponential with an average doubling time of just over 8 years. The population has now reached levels estimated from the Tyrrell survey conducted prior to the introduction of DDT. The Chesapeake Bay population reached the size threshold for "downlisting" in 1988 and for "delisting" in 1992.

A reproductive rate of 0.7 chicks/breeding attempt has been believed to represent the threshold for population maintenance for bald eagles (Sprunt et al. 1973). A considerably higher reproductive rate of 1.1 chicks/breeding attempt was set as the recovery goal for the Chesapeake Bay population (Byrd et al. 1990). The reproductive rate documented by Tyrrell in 1936 was nearly 1.5 chicks/breeding attempt. Documented rates for the Chesapeake Bay population reached an all-time low of 0.2 chicks/breeding attempt in 1962 (Abbott 1963). Productivity showed a steady increase throughout the late 1960s and early 1970s, reaching projected maintenance levels by the mid-1970s. For the tidal reach of the Bay, reproductive rates reached the recovery threshold in 1986 and have exceeded this value every year since (Watts et al. In Press(b)).

### 2.1.2 Rappahannock River – Cat Point Creek

**Historic Records** – Bald eagles likely have bred on the Rappahannock River and Cat Point Creek for thousands of years. However, there were no historic nests documented on Cat Point Creek. Tyrell (1936) did not report any nests during his ground survey in 1936. Abbott and Scott (Abbott 1978) did not report any nests along this tributary in their aerial surveys from 1962 through 1976.

**Population Recovery** – The recovery of the bald eagle breeding population along the Rappahannock River is as dramatic as and is consistent with that observed throughout the broader Chesapeake Bay and across the continent. The population has increased from 9

pairs in 1970 (Abbott 1970) to 120 pairs in 2005 (Watts and Byrd 2005). It has been growing exponentially with an average doubling time of less than 6 years. This is a faster rate than the Bay population as a whole and is comparable to some of the fastest growing areas of the region (Watts et al. In Press (a)).

Following the DDT era, bald eagles were first documented to breed along Cat Point Creek in 1979 (Byrd, unpub. data). Since that time, there has been an increasing number of pairs along the creek. There were 5 breeding pairs along the drainage during the 2005 breeding season (Watts and Byrd 2005. These pairs represented 4.2% of the breeding population along the Rappahannock and 1.1% of the Virginia population. Based on observations in early 2006, it appears that the creek may support 7 breeding pairs in 2006 (Figure 2).

**Reproductive Rate –** The Rappahannock River breeding population has exceeded the 1.1 chick/breeding attempt set by the Chesapeake Bay Recovery Plan each year since the mid-1980s. Since the first nest was detected on Cat Point Creek, the goal for reproductive rate in the drainage has been exceeded in 19 of the 25 years and 79 chicks have been produced along the creek.

## 2.2 Bald Eagle Concentration Areas

The Chesapeake Bay is an area of convergence for post-nesting and subadult bald eagles from breeding populations in the Southeast and Northeast. In late spring and early summer, eagles migrate north from Florida and other southeastern states to spend the summer months in the Bay. In the late fall, eagles migrate south from New England populations to spend the winter months on the tributaries of the Bay. The convergence of three geographically distinct populations (northeast, southeast, and Chesapeake Bay) suggests that the Bay plays a particularly important role in the recovery of bald eagles in eastern North America.

Bald eagle "concentration areas" are locations where eagles congregate in numbers much higher than what may be accounted for by local breeding pairs and their offspring and that support one to several communal roosts. Due to the status of the Chesapeake Bay as both a summer and winter destination for migrants, concentration areas may support a complex mix of individuals of different ages and from different populations. For example, during the summer months, concentration areas may support adults, sub-adults and young-of-the-year from the Chesapeake Bay population (some of which may vacate their territories after breeding to move into concentration areas) and from the Southeast. Similarly, winter concentration areas may support non-breeding birds from the Chesapeake Bay and both reproductive and non-breeding birds from the Northeast. Because of this mix, it is difficult to determine how many birds are moving into the Bay from distant source populations. An additional problem is that there has been no definitive treatment of residency times/turnover rates of birds within concentration areas. For this reason, it is not possible to infer how many different individuals may be using particular concentration areas over an extended period.

### 2.2.1 Summer Concentration Areas

**Chesapeake Bay** – The northward migration of bald eagles from Florida to the Chesapeake Bay was first documented during a review of band returns from the 1940s by Broley (1947). Broley showed that young birds banded in Florida as nestlings migrated north along the coast to the mid-Atlantic (or in a few instances further north). Definitive confirmation of these early findings has been obtained in recent years by Millsap et al. (2002) who used satellite telemetry to track 57 young eagles from Florida to their summer territories. Nearly 50% of these birds spent the summer in the Chesapeake Bay or coastal North Carolina. The birds returned to Florida for the winter months and established winter territories. What proportion of the southeastern populations (outside of Florida) migrates to the Bay for the summer is currently unknown. Observations of birds within several of these concentration areas (Watts pers. obs.) implies that the migrants utilize the Bay not just as foraging areas but as a molting ground suggesting that the Bay plays an important role in their annual cycle.

Based on band returns and direct observations, Broley (1947) estimated that birds begin to leave Florida in April. This estimate was consistent with telemetry data obtained by Millsap et al. (2002). Migrant eagles appear to move into the Bay in early to mid-May. Use of concentration areas begins to rise during this period and reaches a peak between mid-June and mid-July (Watts and Byrd, unpublished data for lower Bay). In most years, numbers decline within concentration areas from mid-July through the end of September (Watts and Byrd, unpublished data for lower Bay). The timing of movements out of the Bay is consistent with Broley's (1947) estimate from band recoveries of when birds return to Florida. Adults and sub-adults exhibit different schedules of migration and appear to have different residency periods within the Bay. Birds that move into the Bay in May are predominantly sub-adults. These birds are followed by adults such that the ratio of adults to sub-adults increases through the early summer and eventually reaches an approximate 1:1 ratio by the peak period. Age ratio shifts back toward a sub-adult bias through the early fall. Taken together, these patterns suggest that adults enter the Bay later and stay for a shorter period of time compared to sub-adults.

Migrant eagles are not distributed evenly throughout the Chesapeake Bay during the summer months. Since the early 1980s, six summer concentration areas have been identified and delineated that consistently support birds year after year. These include the upper James River (Scott 1971, Clark 1992, Watts and Factor 1994, Watts and Whelan 1997, Watts and Byrd 1999), the upper Rappahannock River (Portlock 1994, Watts 1998), the upper Potomac River (including several sub-sites) (Wallin and Byrd 1984, Caledon State Natural Area unpubl. data, Mason Neck, NWR unpubl. data), the Pocomoke River (Watts unpubl. data), the Nanticoke River (Watts unpubl. data), and the upper Bay including Aberdeen Proving Ground (Millsap et al. 1983, SWCA, Inc. 1995). In addition to these somewhat stable concentration areas, it should be noted that eagles are very responsive to the distribution of prey and through the years ephemeral concentration areas have been documented that develop and disband in response to short-term food resources (Watts pers. obs.).

In general, use of summer concentration areas has not been monitored as intensively as the breeding population. Peak counts of birds using the upper James River concentration area increased by a factor of 5 between 1982 and 1991 (Watts and Byrd 1999). This level of increase is generally consistent with the growth in the populations believed to utilize the Bay during summer. Collectively, summer concentration areas within the Chesapeake Bay support a minimum of 1,500 birds. This composite number is based on peak bald eagle estimates within concentration areas during the mid-1990s from shoreline surveys. Peak counts include: James River (450), upper Rappahannock River (320), Upper Potomac River (500+), Pocomoke River (30), Nanticoke River (150), and the upper Chesapeake Bay including Aberdeen Proving Ground (100). How many total birds may pass through these areas during the summer months or what proportion of birds is from distant populations is unknown.

**Rappahannock River – Cat Point Creek** – Beginning in the mid-1980s, Portlock (1994) began documenting elevated numbers of eagles along the shoreline between Tappahannock and Port Royal. Surveys during the summer months between 1987 and 1994 showed a range of numbers between 30 and 77 birds. In 1993, high-use shoreline areas were used to delineate the Rappahannock River Bald Eagle Concentration Area between Paynes Island and Port Royal (Watts et al. 1994b). In 1998, Watts (1998) conducted a series of 6 shoreline surveys between 17 June and 14 September and documented a peak count of 232 birds between Tappahannock and Mount Swamp above Port Royal. Shoreline use patterns were used to re-delineate the Rappahannock River Bald Eagle Concentration Area to between these boundaries.

Although Cat Point Creek is included within the Rappahannock River Bald Eagle Concentration Area, definitive information is not available on the use of Cat Point Creek by over-summering eagles. The intensive study conducted during the summer of 1998 focused on the main stem of the river and did not include tributaries such as Cat Point Creek that could not be seen from the primary shoreline. Surveys done in recent years (up to the Route 624 bridge), have documented 30-40 birds along the creek during the summer months with the age ratio being approximately 50:50 adults and juveniles (Portlock, pers. Comm.). However, spatial distribution along the shoreline has not been recorded. Limited trips upstream of the Route 624 bridge have documented up to 20 birds during the summer months.

### 2.2.2 Winter Concentration Areas

**Chesapeake Bay** – Bald eagles from northeastern Canada and the United States migrate southward into the Chesapeake Bay during the late fall and early winter period (Stewart and Robbins 1958, McCollough 1986, Byrd et al. 1990). These birds apparently move south in advance of large water bodies freezing over in northern latitudes and their appearance in the Bay coincides with the movement of waterfowl into the area. Numbers increase through November and December typically reaching a peak in January. Most northern birds are believed to have moved northward out of the Bay by late March.

As during the summer months, wintering eagles are not distributed evenly throughout the Chesapeake Bay. Several concentration areas have been described including the upper Chesapeake Bay (APG and lower Susquehanna River), Blackwater NWR, Fishing Bay WMA, Pocomoke River, upper Potomac River (Mason Neck NWR to Caledon Natural Area), upper Rappahannock River, upper James River, and the northwest corner of the Great Dismal Swamp NWR (Byrd et al. 1990, Fraser et al. 1991, Watts unpublished data, Schwab pers. comm.). In addition to these somewhat stable concentration areas, it should be noted that eagles are very responsive to the distribution of prey and through the years ephemeral concentration areas have been documented that develop and disband in response to short-term food resources (Watts pers. obs.).

As with summer concentration areas, winter concentration areas within the Chesapeake Bay have not been monitored with the same intensity as the breeding population. However, mid-winter surveys have been conducted in both Virginia and Maryland within selected concentration areas since the early 1960s (Abbott and Scott, unpublished notes). Between 1997 and 2000 the number of birds within Virginia sampling areas increased at an annual rate of 4.5% (Steenhof et al. 2002). This rate is considerably below that reported for the expected source populations. For example, the population throughout the conterminous United States increased at an annual rate of 8.6% between the mid-1980s and mid-1990s (Buehler 2000), a rate very similar to the breeding population of the Chesapeake Bay. Some specific wintering sites have shown considerably higher increases in use than the overall state average. For example, numbers on the Rappahannock between Tappahannock and Port Royal have increased ten fold from 30 to 300 individuals during the period from the late 1980s to present (e.g. Portlock 1994, Portlock unpublished). A similar increase has been seen in the Upper Chesapeake Bay Concentration Area around Aberdeen Proving Grounds (Pottie 2001).

**Rappahannock River – Cat Point Creek** – The Rappahannock River supports the most significant winter bald eagle concentration area in Virginia. Elevated numbers along the shoreline between Tappahannock and Port Royal have been known since the early 1980s when consistent aerial surveys were conducted during the mid-winter period (Byrd, unpub. data). From surveys conducted between 1987 and 1994, Portlock (1994) documented peak numbers on the river during the month of January. January surveys included 96, 104, and 98 birds during the years 1992, 1993, and 1994 respectively. Portlock (1994) identifies the Fones Cliffs-Paynes Island and Horsehead Point-Nanzatico Bay as particularly significant concentration areas. VDGIF and Portlock have coordinated mid-winter surveys along the river between Tappahannock and Mount Swamp since 1997. The average (mean $\pm$ standard error) count total for this time period (1997-2005) was 177.1 + 29.93 with a high count of 383 on February 7, 2005 (Table 2). Age ratio for known-age birds was 50.7% adults and 49.3% juveniles.

**Table 2. Results for mid-Winter bald eagle surveys within the Rappahannock River Bald Eagle Concentration Area (between Tappahannock and Mount Swamp).** Parenthetic values indicate number along the shoreline of Cat Point Creek.

| Survey Date | Adult (CPC) | Juvenile (CPC) | Unknown (CPC) | Total (CPC) |
|---|---|---|---|---|
| 1/24/97 | 88 (10) | 80 (9) | 2 (0) | 170 (19) |
| 1/16/98 | 32 (3) | 40 (5) | 1 (0) | 73 (8) |
| 1/12/99 | 65 (5) | 96 (21) | 1 (0) | 162 (26) |
| 1/7/00 | 57 (12) | 90 (16) | 5 (1) | 152 (29) |
| 1/12/01 | 129 (23) | 147 (18) | 0 (0) | 276 (41) |
| 1/8/02 | 118 (41) | 139 (54) | 0 (0) | 257 (95) |
| 1/11/03 | 99 (19) | 97 (22) | 2 (0) | 198 (41) |
| 1/14/04 | 76 (18) | 58 (20) | 4 (1) | 138 (39) |
| 2/7/05 | 215 (37) | 160 (32) | 8 (0) | 383 (69) |
| 1/19/06 | 127 (20) | 137 (42) | 12 (0) | 276 (62) |
| Source: Virginia Department of Game & Inland Fisheries. | | | | |

In recent years, Cat Point Creek has become a focal area for birds within the Rappahannock River Bald Eagle Concentration Area. The deep channel and apparent abundance of gizzard shad and other prey fish have drawn the birds to the site in increasing numbers. A high count of 95 birds was detected on the creek during the mid-winter survey of 2002. This number represented 37% of the birds within the entire Rappahannock River Concentration Area during that year. Over all years, birds on the creek represent a very significant portion (>20%) of all birds detected within the greater concentration area. This is a surprisingly large portion for such a small tributary. It should be noted that the count only extends up to the Route 624 bridge. Birds detected upstream of the bridge are counted but it is not possible to see beyond the first bend in the creek. On 9 March, 2005 during the annual nest survey 23 birds were detected upstream of the bridge (Watts, per. obs.). Over the 10 years of survey, the number of birds over wintering on the Rappahannock River has increased dramatically. The number of birds observed on Cat Point Creek has increased from an average of 24.6 between 1997 and 2001 to 61.2 between 2002 and 2006. In addition to this overall increase, the distribution of eagles on Cat Point Creek has become more concentrated around the location of the Route 624 bridge (Figures 3a through 3c). The underlying cause of this shift is not clear but likely relates to the availability of prey within surrounding waters. At present, this location is the highest use shoreline segment within the greater Rappahannock River Bald Eagle Concentration Area.

## 2.3 Communal Roosts

### 2.3.1 Chesapeake Bay

Non-breeding bald eagles within concentration areas are typically very gregarious. Rather than roosting individually, birds often form communal roosts where several to

several hundred individuals roost together within a relatively confined space. Within the Chesapeake Bay, communal roosts have been identified that support several to well over 100 birds during different periods of the year (e.g. Wallin and Byrd 1984, Haines 1988, Buehler et al. 1991b, Watts unpubl. data).

Although communal roosts have been identified within different situations throughout the Chesapeake Bay, most sites share some physical characteristics. Most sites discovered: 1) are positioned close to major foraging areas, 2) are isolated from human disturbance, 3) contain suitable substrate for roosting, and 4) when applicable are positioned in areas protected from harsh weather. Another characteristic that seems to be common among roost sites is a clear movement corridor between the roost and primary foraging areas. Substrates include both pines and/or hardwoods. Actual roost trees tend to be large with good crown access for entry and exit. This typically means that they are supercanopy trees or are along some type of habitat discontinuity (e.g. tree edge along a field, waterway, or marsh). Roosts also have been known to occur within stands of dead snags over flooded marshes or beaver ponds.

The use of communal roost sites depends on several factors such that sites may form and be used for variable lengths of time. Bald eagles are very opportunistic foragers and concentrated food patches that are ephemeral may lead to the formation of communal roosts sites that may only be used for a couple of days. In contrast, sites that are strategically located within stable concentration areas may be used for many years. Concentration areas that depend on seasonal prey bases have communal roosts that are seasonal in use. Because the location of roost sites depends not only on the characteristics of the site itself but also on the distribution of prey, changes in site characteristics, the surrounding landscape, or the distribution of foraging areas may all influence site use. The distribution of communal roosts in the lower Chesapeake Bay has been documented to shift rapidly in response to changes in the distribution of both prey and supercanopy trees (Watts unpublished data). For example, a communal roost supporting 45 birds was observed to form rapidly in response to a fish die off near the James River (Watts pers. obs.). Similarly, communal roosts have been documented to form rapidly following a selective pine harvest on the James River (Watts pers. obs.). Chronic disturbance within primary foraging areas has also been shown to change roost use (Watts, unpublished data). For example construction of a fishing pier in Charles City County caused a shift in the distribution of foraging eagles and the use of communal roosts (Watts and Factor 1994). Similarly, an increase in military training along a section of shoreline that previously was used extensively by foraging eagles caused a shift in shoreline use and communal roost use.

### 2.3.2 Rappahannock River – Cat Point Creek

Numerous communal roosts have been documented over the years within the Rappahannock River Concentration Area (Watts, unpublished data). However, relatively little work has been conducted along Cat Point Creek to locate communal roosts and document their seasonal use. Based on limited observations, there are two locations known to support communal roosts (Figure 4). The first is located within a pine stand

along the creek on the Rappahannock River NWR. This site was documented to support at least 10 individuals during December 2004. The second site is located along the edge of a pine stand near Manokin Bay. This site was documented to support at least 15 individuals in the early part of 2006.

## 2.4 Management Guidelines

VDGIF and USFWS are responsible for the conservation and management of the bald eagle throughout Virginia. To provide consistent management of the bald eagle in Virginia, the VDGIF and USFWS have developed general guidelines. These guidelines indicate the zones around eagle nests, night roosts, and shoreline use areas in which the provisions of various laws and their implementing regulations may apply. All proposed activities that may affect or result in the take of a bald eagle in Virginia will be evaluated by the VDGIF and USFWS on a case-by-case basis, using site-specific information.

### 2.4.1 Nest Management

Nest locations within Virginia are currently managed using a combination of buffer zones and time-of-year restrictions (Watts 2005). This general approach is consistent with that used to manage other populations throughout the species range (e.g., Cline 1985, 1990). Management buffers include a primary management zone (229-meter or 750-foot radius around the nest) and a secondary management zone (from the outer edge of the primary buffer to 400-meter or 1,320-foot radius around the nest). Activity and time-of-year restrictions vary between zones with the most restrictive recommendations being placed within the primary zone. Management buffers and time-of-year restrictions apply to nests determined to be active during the current breeding season. The term active refers to nests where a breeding attempt has been documented (i.e., bird in incubation posture, eggs or chicks observed in the nest).

**Primary Management Buffer** – The following activities should not occur at any time within this zone: land clearing, clear cutting, mining, and other habitat modification activities; development of residential, recreational, agricultural, commercial, or industrial structures, power lines, roads, trails, or any other construction activity; use of chemicals toxic to wildlife, such as pesticides and herbicides. The following activities should not occur during the breeding/nesting season (December 15 - July 15): maintenance of existing buildings and roads; use of motorized vehicles and heavy equipment; aircraft flyovers within 1,000 vertical feet of the ground; human entry and activities, including recreation, such as hiking, camping, picnicking, hunting, fishing, boating, jet skiing, etc.; loud noise generating activities, including blasting.

**Secondary Management Buffer** – The following activities should not occur at any time within this zone: development of multi-story buildings; high density housing (construction of single story, low density residential houses may be acceptable); large commercial, industrial, or agricultural facilities; high traffic roads; and facilities that would generate loud noise; use of chemicals toxic to wildlife, such as pesticides and herbicides. The following activities should not occur during the breeding/nesting season

(December 15 - July 15): aircraft flyovers within 1,000 vertical feet of the ground; construction activities; recreational activities that generate loud noise, such as motorized boats, jet skis, etc.; other loud-noise-generating activities, including blasting.

### 2.4.2 Roost-site Management

Communal Roost Sites within Virginia are currently managed using a combination of buffer zones and activity restrictions. This general approach is consistent with that recommended for this species throughout its range (e.g., Stalmaster and Newman 1978, Steenhof 1978, Cline 1990). Throughout the Chesapeake Bay region, establishment of human activity buffers around communal roost sites is a stated objective (Byrd et al. 1990). However, less attention has been given to both monitoring and management of communal roosts. In addition, less effort has been expended to locate existing communal roosts. In Virginia, communal roosts are given consideration similar to that given active nests (Watts 2005), with management buffers including a primary management zone (229-meter or 750-foot radius around the delineated roost area) and a secondary management zone (from the outer edge of the primary buffer to 400-meter or 1,320-foot radius around the roost). Time-of-year restrictions on winter roosts are 1 November through 28 February and for summer roosts are 1 May through 30 September. Activities that fall under these restrictions are determined on a case-by-case basis.

### 2.4.3 Shoreline Management

Shoreline segments that are known to be adjacent to important foraging areas are currently managed in Virginia using a buffer zone with restrictions in recreational activity. This general approach is consistent with that recommended for this species throughout its range (Cline 1990). However, the details of implementation vary considerably between locations. Buffer zones of 250 to 350 meters have been recommended for populations in the Pacific Northwest (Stalmaster and Newman 1978, Knight and Knight 1984). These values reflect the flushing responses of eagles perched along the shoreline to approaching boats (Knight and Knight 1984, McGarigal 1988, Watts and Whalen 1997). At this time, there are only 2 locations within the Chesapeake Bay with shoreline restrictions imposed to protect bald eagle foraging areas. These include Caledon State Natural Area on the Virginia shoreline of the Potomac where a buffer is marked with restricted boat access along the shoreline and Aberdeen Proving Ground along the upper Bay of Maryland that maintains a buffer for recreational boating of 200 meters along shorelines known to be preferred foraging areas. How these management buffers are enforced is not clear.

## 3.0 BOAT TRAFFIC

There is no data source available that allows for the assessment of boat traffic and distribution within the Chesapeake Bay. A study within the James River Bald Eagle Concentration Area shows that boat distribution is influenced to a great degree by 1) ramps and other access points and 2) the distribution of navigable water (Watts and Whalen 1997). Boat traffic was also shown

to vary with the time of day, weather conditions, and the type of day (weekend vs week day). Boat traffic varies seasonally with more boats being on the water during the summer months.

Within both the James and Rappahannock River Bald Eagle Concentration Areas, boat type was associated with the likelihood of impacting foraging eagles along the shoreline (Watts and Whalen 1997, Watts 1998). Recreational fishing boats tend to get onto the water earlier and disturb eagles during their primary foraging period compared to sport boats. These boats also tend to "trapline" the shoreline during the course of the morning and so impact a greater portion of the shoreline compared to pleasure boats that tend to move more frequently along marked channels. Smaller craft such as bass boats and jet skis have more potential to impact eagles because they have shallow drafts and are more capable of moving closer along the shoreline and accessing shallow coves. Within the James River Bald Eagle Concentration Area common boat types (N = 443) included sport boats (57.1%), bass boats (13.5%), jet skis (9.0%) and jon boats (6.8%).

### 3.1 Rappahannock River

Within the Rappahannock River Bald Eagle Concentration Area boat distribution was shown to be skewed to the sections of river just upstream of Tappahannock and surrounding Port Royal (Watts 1998). This distribution reflects the major population centers and water access points. From a sample of 199 boats, type included sport boat (41.4%), bass boat (32.9%), jon boat (12.9%), sail boat (5.7%) and jet ski (2.9%).

### 3.2 Cat Point Creek

There is no quantitative data available on the traffic or distribution of boats on Cat Point Creek. On 6 January, 2006 the VDGIF game warden who patrols that area indicated that boat traffic on the creek appears to be influenced by season and weather. Boat traffic on the creek is often high during the summer months and is elevated when conditions are windy on the Rappahannock. Boats from the Naylor's Beach area and from Tappahannock come up the creek during windy days because it is sheltered. The warden further indicated that most of the boat traffic is between the mouth and the Route 624 bridge with only small jon boats and jet skis typically moving under the bridge to access the upper reach. It should be noted that his vessel is too large to pass under the bridge and he does not patrol the upper reach. Heritage Park Resort manages a boat ramp above the Route 624 bridge such that access to the upper reach is not restricted to boats capable of moving under the bridge.

Channel width along Cat Point Creek is relatively narrow. Based on flushing probabilities derived from 2 shoreline studies, it is possible to project the probability of eagles flushing from a shoreline in response to a single boat moving down the navigable channel along Cat Point Creek (Figure 5). It is clear from this projection that eagles perched along the shoreline are vulnerable to boat traffic. The highest quality foraging perches (those in close proximity to open water) are generally distributed along the most vulnerable shoreline segments. It is not possible to pilot a boat along the creek and not flush eagles when they are there. This is particularly true along the uppermost navigable reach of the creek.

## 4.0 EFFECTS OF PROPOSED ACTION

### 4.1 Breeding Population

Replacement of the Route 624 Bridge will require several months of construction (Table 1). Human activities associated with construction cause direct impacts to eagles that are in close proximity to construction sites. When completed, the proposed bridge will be elevated to the extent that it will allow boat traffic to access the upper reach of Cat Point Creek from downstream locations. The change in access will have long-term implications to current and future breeding pairs within the upper reaches of the drainage.

#### 4.1.1 Direct Effects

Cat Point Creek currently supports several active bald eagle nests (Figure 2). However, the bridge project is outside the management buffers of all nests. Under current management guidelines, activities occurring beyond management buffers are not restricted and are believed to pose no threat to pairs. For this reason, the actual construction phase of the bridge project is not expected to represent a threat to breeding activity.

#### 4.1.2 Indirect Effects

Despite the fact that there is an active boat ramp on Cat Point Creek above the Route 624 bridge, the overwhelming majority of watercraft using the creek and the Rappahannock River in the vicinity of Tappahannock originate from other locations. Available observations suggest that the majority of boat traffic within Cat Point Creek is downstream of the Route 624 bridge. Traffic above the bridge includes boats that are launched from the Heritage Park ramp or are low enough (jon boats and jet skis) to make it under the current bridge clearance. Based on the type and size of boats on the Rappahannock River in the vicinity of Tappahannock, raising the height of the bridge at mean high water from 4 ft to 10 ft will permit access to the upper reach of Cat Point Creek to virtually all watercraft on the Rappahannock River. Removal of the clearance barrier that has been in place since the 1950s will increase the traffic on the upper reach of the creek. There are currently 3 active bald eagle nests upstream of the Route 624 Bridge (Watts and Byrd 2005). Increasing recreational boat activity in the upper reaches of Cat Point Creek may impact foraging opportunities for pairs breeding within that area.

#### 4.1.3 Effects Determination

**May Affect, Not Likely to Adversely Affect –** The footprint of proposed bridge construction is not within the management buffer of any active bald eagle nest. For this reason, the construction phase is not expected to impact an active nest or subject to activity or time-of-year restrictions designed to protect nesting activity. Although elevation of the bridge above current height will increase use of the upper reaches of Cat

Point Creek by recreational boaters, resulting in a potential increase in impacts to foraging activities of breeding pairs upstream of the bridge, current management guidelines in Virginia do not address this scenario.

## 4.2 Summer Concentration Area

Replacement of the Route 624 Bridge will require several months of construction (Table 1). Human activities associated with construction cause direct impacts to eagles that are in close proximity to construction sites. When completed, the proposed bridge will be elevated to the extent that it will allow boat traffic to access the upper reach of Cat Point Creek from downstream locations. The impact of increased boat traffic within the upper reach on shoreline use by over-summering eagles is not clear.

### 4.2.1 Direct Effects

Although Cat Point Creek is included within the Rappahannock River Bald Eagle Concentration Area, definitive information is not available on the use of Cat Point Creek by over-summering eagles. Shoreline surveys in recent years suggest that summer use is approximately 30 birds or 30% of winter use. However, no distribution information has been collected. Current management guidelines pertain to shoreline segments with documented high use. These guidelines draw their authority from the accepted definition of "disturb" under the Endangered Species Act which pertains to foraging and sheltering areas. Since the shoreline within ¼ mile of the proposed project area has not been designated as a high-use shoreline due to the lack of survey information, current guidelines do not restrict activity based on over-summing birds. For this reason, there is no anticipated impact on over-summering birds from the construction phase.

### 4.2.2 Indirect Effects

Despite the fact that there is an active boat ramp on Cat Point Creek above the Route 624 bridge, the overwhelming majority of watercraft using the creek and the Rappahannock River in the vicinity of Tappahannock originate from other locations. Available observations suggest that the majority of boat traffic within Cat Point Creek is downstream of the Route 624 bridge. Traffic above the bridge includes boats that are launched from the Heritage Park ramp or are low enough (jon boats and jet skis) to make it under the current bridge clearance. Based on the type and size of boats on the Rappahannock River in the vicinity of Tappahannock, raising the height of the bridge at mean high water from 4 ft to 10 ft will permit access to the upper reach of Cat Point Creek to virtually all watercraft on the Rappahannock River. Removal of the clearance barrier that has been in place since the 1950s will increase the traffic on the upper reach of the creek. Current management guidelines pertain to shoreline segments with documented high use. These guidelines draw their authority from the accepted definition of "disturb" under the Endangered Species Act which pertains to foraging and sheltering areas. Although the upper reach of Cat Point Creek falls within the Rappahannock River Bald Eagle Concentration Area, the shoreline above the Route 624 bridge has not been delineated as a high-use shoreline due to the lack of survey information such that current

guidelines do not restrict activity based on over-summing birds. For this reason, there is no anticipated impact of the increase in boats during the summer months on over-summering birds.

### 4.2.3 Effects Determination

**May Affect, Not Likely to Adversely Affect –** The Route 624 Bridge project is within the Rappahannock Bald Eagle Summer Concentration Area. However, there are no shoreline segments along the creek currently delineated as high-use for eagles during the summer period due to the lack of survey information. For this reason, the bridge does not fall within any ¼ mile buffer of a high-use shoreline and is not expected to impact over-summering eagles, nor is it subject to current management guidelines due to over-summering birds. Although elevation of the bridge clearance will increase the level of boat traffic within the upper reach of the creek, there are currently no delineated high-use shoreline segments during the summer months due to the lack of survey data. For this reason, increased boat traffic does not fall within the ¼ mile buffer area designed to protect shoreline segments delineated as high-use foraging areas.

## 4.3 Within Winter Concentration Area

Replacement of the Route 624 Bridge will require several months of construction (Table 1). Human activities associated with construction cause direct impacts to eagles that are in close proximity to construction sites. When completed, the proposed bridge will be elevated to the extent that it will allow boat traffic to access the upper reach of Cat Point Creek from downstream locations.

### 4.3.1 Direct Effects

Cat Point Creek is included within the Rappahannock River Bald Eagle Concentration Area. Mid-winter surveys over a ten year period have documented the use and distribution of birds along the creek to just above the Route 624 bridge. In recent years, the east shoreline above and below the bridge has been documented as one of the highest use shorelines within the Rappahannock River Bald Eagle Concentration Area. Under current guidelines, activities within ¼ mile of this shoreline are subject to possible restrictions. These guidelines draw their authority from the accepted definition of "disturb" under the Endangered Species Act which pertains to foraging and sheltering areas. Under current guidelines, activities within the protection buffer of documented high-use shorelines during winter are subject to time-of-year restrictions from 1 November through 28 February.

### 4.3.2 Indirect Effects

Despite the fact that there is an active boat ramp on Cat Point Creek above the Route 624 bridge, the overwhelming majority of watercraft using the creek and the Rappahannock River in the vicinity of Tappahannock originate from other locations. Available observations suggest that the majority of boat traffic within Cat Point Creek is

downstream of the Route 624 bridge. Traffic above the bridge includes boats that are launched from the Heritage Park ramp or are low enough (jon boats and jet skis) to make it under the current bridge clearance. Based on the type and size of boats on the Rappahannock River in the vicinity of Tappahannock, raising the height of the bridge at mean high water from 4 ft to 10 ft will permit access to the upper reach of Cat Point Creek to virtually all watercraft on the Rappahannock River. Removal of the clearance barrier that has been in place since the 1950s will increase the traffic on the upper reach of the creek. Current management guidelines pertain to shoreline segments with documented high use. These guidelines draw their authority from the accepted definition of "disturb" under the Endangered Species Act which pertains to foraging and sheltering areas. Although the upper reach of Cat Point Creek falls within the Rappahannock River Bald Eagle Concentration Area, the shoreline above the Route 624 bridge has not been delineated as a high-use shoreline due to the lack of survey information such that current guidelines do not restrict activity based on over-wintering birds. For this reason, there is no anticipated impact of the increase in boats during the winter months on over-wintering birds.

### 4.3.3 Effects Determination

**Likely to Adversely Affect –** The Route 624 Bridge project is within the Rappahannock Bald Eagle Winter Concentration Area. Winter survey data documents that the east shoreline around Route 624 receives some of the highest use of any shoreline within the concentration area. The bridge project falls within the ¼ buffer area of this shoreline. If construction occurs during the winter months, activities will impact eagles along this shoreline. Although elevation of the bridge clearance will increase boat access and traffic within the upper reach of Cat Point Creek, there are currently no delineated high-use shoreline segments above the bridge due to the lack of survey information. For this reason, the increased boat traffic is not expected to impact shoreline use by eagles above the bridge.

## 4.4 Communal Roosts

Replacement of the Route 624 Bridge will require several months of construction (Table 1). Human activities associated with construction cause direct impacts to roosting eagles that are in close proximity to construction sites. When completed, the proposed bridge will be elevated to the extent that it will allow boat traffic to access the upper reach of Cat Point Creek from downstream locations.

### 4.4.1 Direct Effects

Cat Point Creek currently supports two communal roosts of bald eagles (Figure 4). However, the bridge project is outside the management buffers of both roost areas. Under current management guidelines, activities occurring beyond management buffers are not restricted and are believed to pose no threat to roost sites. For this reason, the actual construction phase of the bridge project is not expected to represent a threat to known communal roosts.

### 4.4.2 Indirect Effects

Despite the fact that there is an active boat ramp on Cat Point Creek above the Route 624 bridge, the overwhelming majority of watercraft using the creek and the Rappahannock River in the vicinity of Tappahannock originate from other locations. Available observations suggest that the majority of boat traffic within Cat Point Creek is downstream of the Route 624 bridge. Traffic above the bridge includes boats that are launched from the Heritage Park ramp or are low enough (jon boats and jet skis) to make it under the current bridge clearance. Based on the type and size of boats on the Rappahannock River in the vicinity of Tappahannock, raising the height of the bridge at mean high water from 4 ft to 10 ft will permit access to the upper reach of Cat Point Creek to virtually all watercraft on the Rappahannock River. Removal of the clearance barrier that has been in place since the 1950s will increase the traffic on the upper reach of the creek. There is currently a single, known communal roost of bald eagles above the Route 624 bridge. Increasing recreational boat activity in the upper reaches of Cat Point Creek may impact foraging opportunities for pairs breeding within that area.

### 4.4.3 Effects Determination

**May Affect, Not Likely to Adversely Affect –** The footprint of proposed bridge construction is not within the management buffer of either communal roost on Cat Point Creek. For this reason, the construction phase is not subject to activity or time-of-year restrictions designed to protect roosting birds from disturbance. Although elevation of the bridge clearance will increase boat access and traffic above within the upper reach of the creek, it seems unlikely that this increase will cause the abandonment of this roost site given that the birds only utilize this site from dusk until before dawn. Furthermore, current management guidelines in Virginia do not address this scenario.

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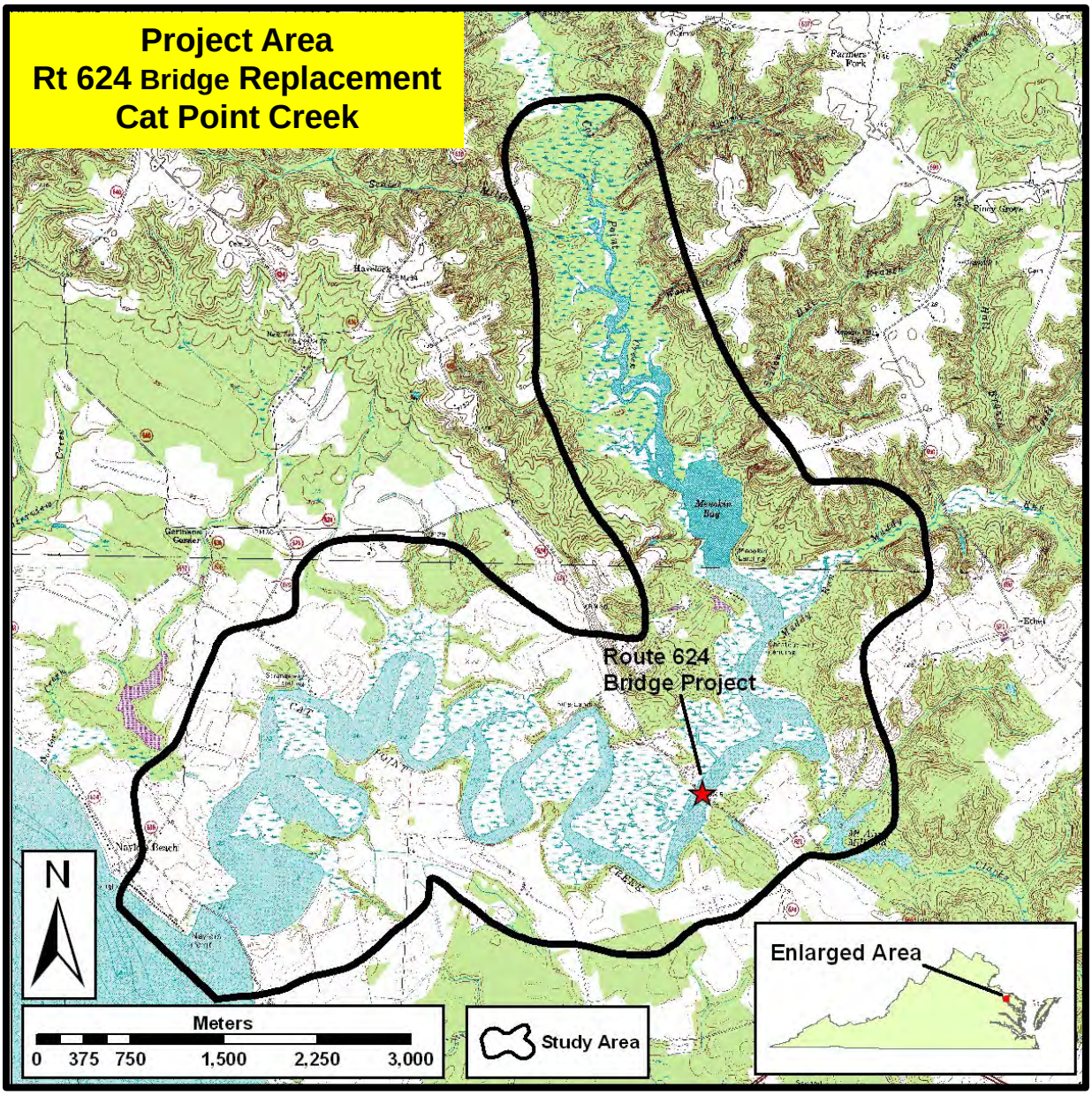


**Figure 1. Cat Point Creek project area for biological assessment.**

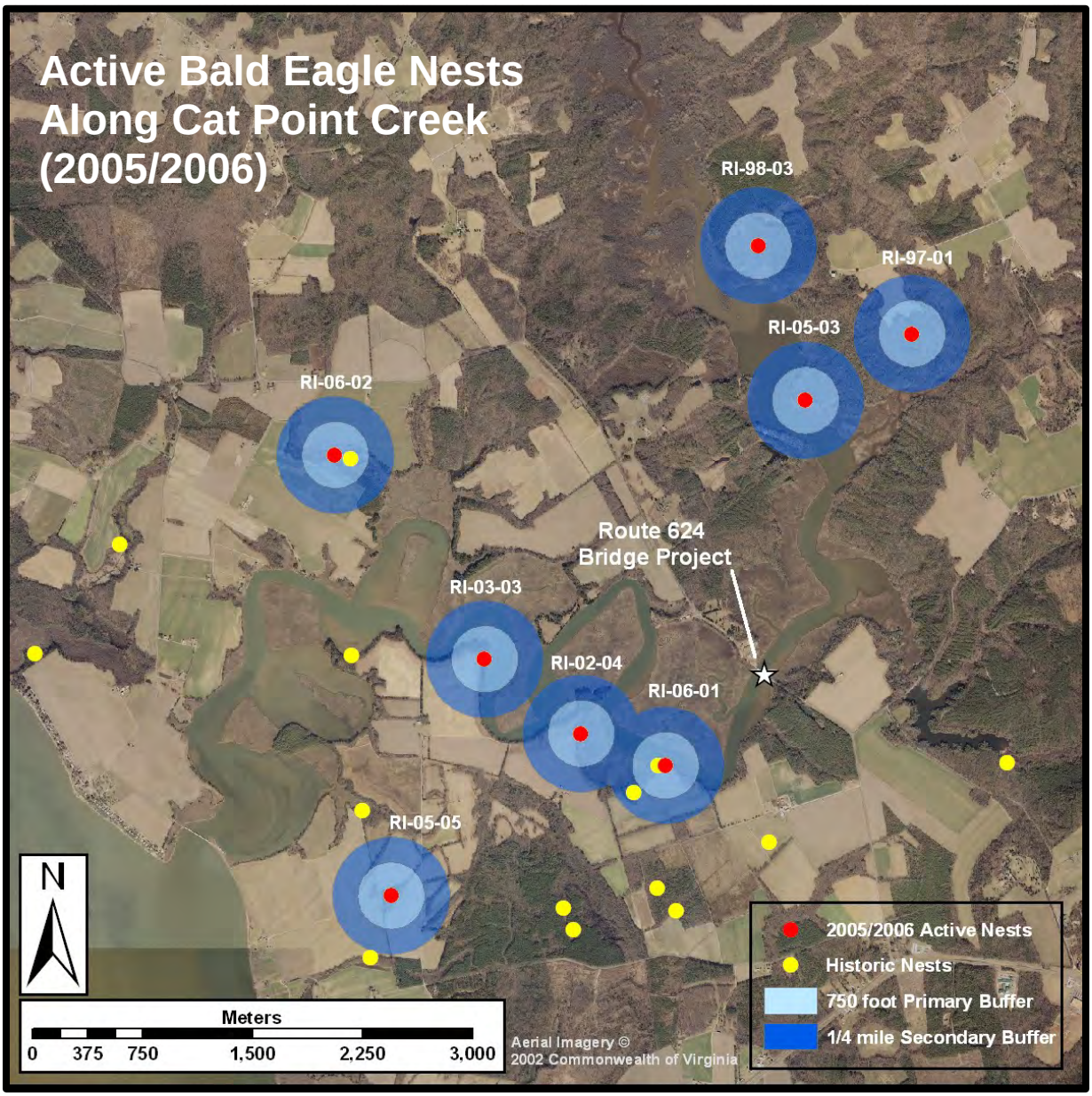


**Figure 2. Map of bald eagle nests known to be active in 2005 (Watts and Byrd 2005) and suspected to become active in 2006 (Watts, pers. obs.) with applied management buffers.**

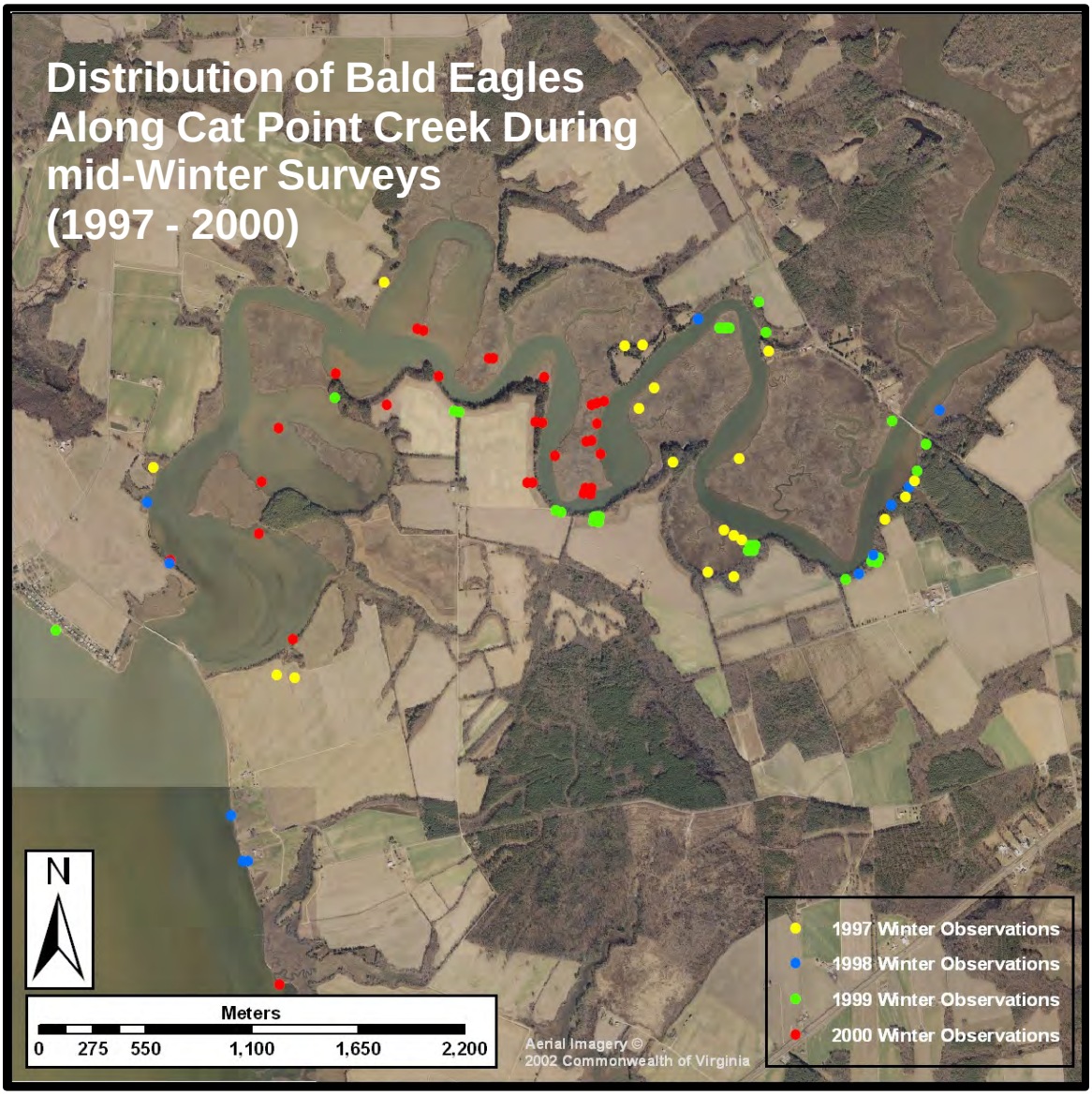


**Figure 3a. Distribution of bald eagles along Cat Point Creek during mid-Winter surveys (1997-2000). Survey did not cover shorelines out of sight upstream of the Route 624 Bridge. Data provided by Virginia Department of Game & Inland Fisheries.**

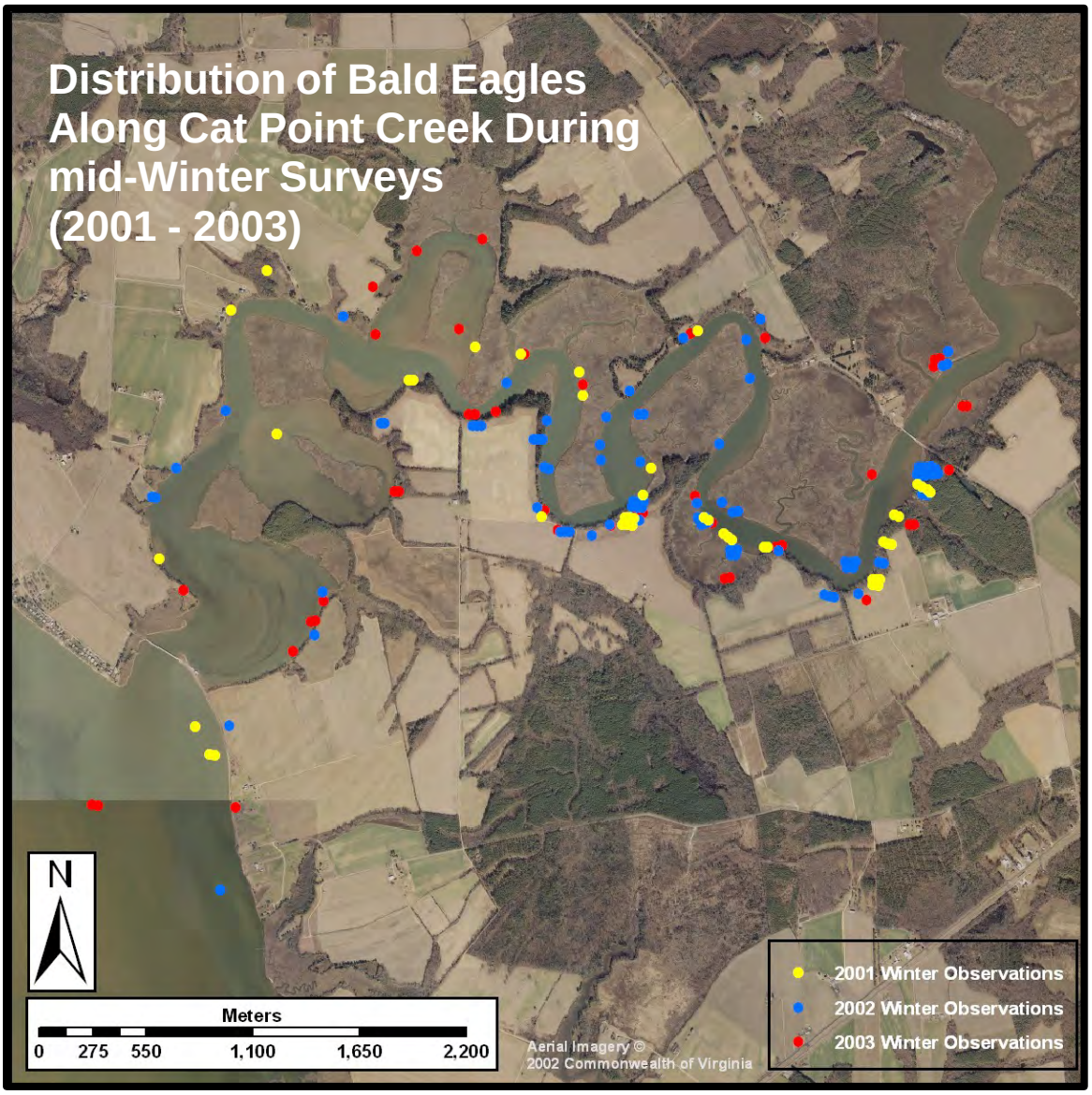


**Figure 3b. Distribution of bald eagles along Cat Point Creek during mid-Winter surveys (2001-2003). Survey did not cover shorelines out of sight upstream of the Route 624 Bridge. Data provided by Virginia Department of Game & Inland Fisheries.**

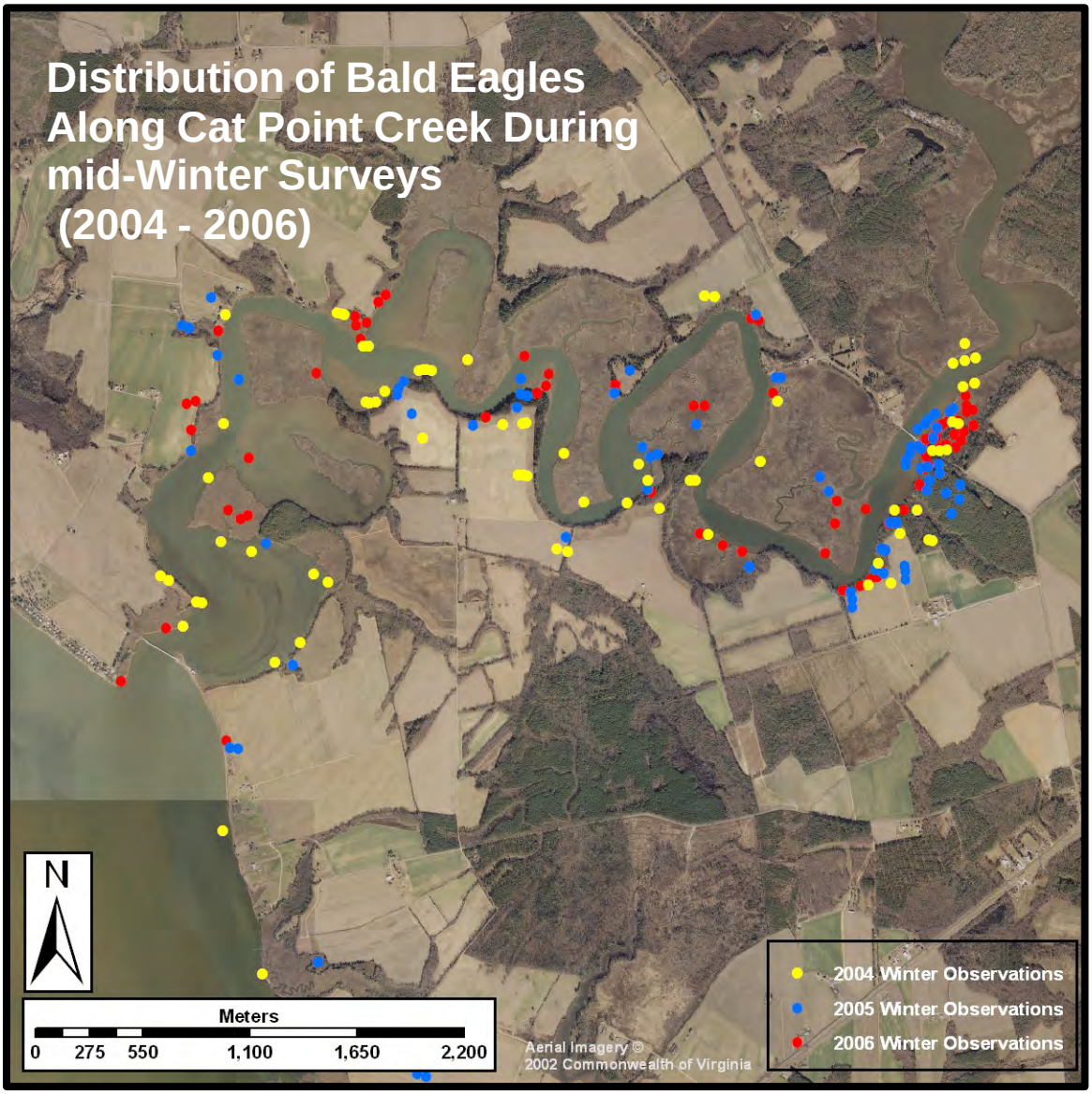


**Figure 3c. Distribution of bald eagles along Cat Point Creek during mid-Winter surveys (2004-2006). Survey did not cover shorelines out of sight upstream of the Route 624 Bridge. Data provided by Virginia Department of Game & Inland Fisheries.**

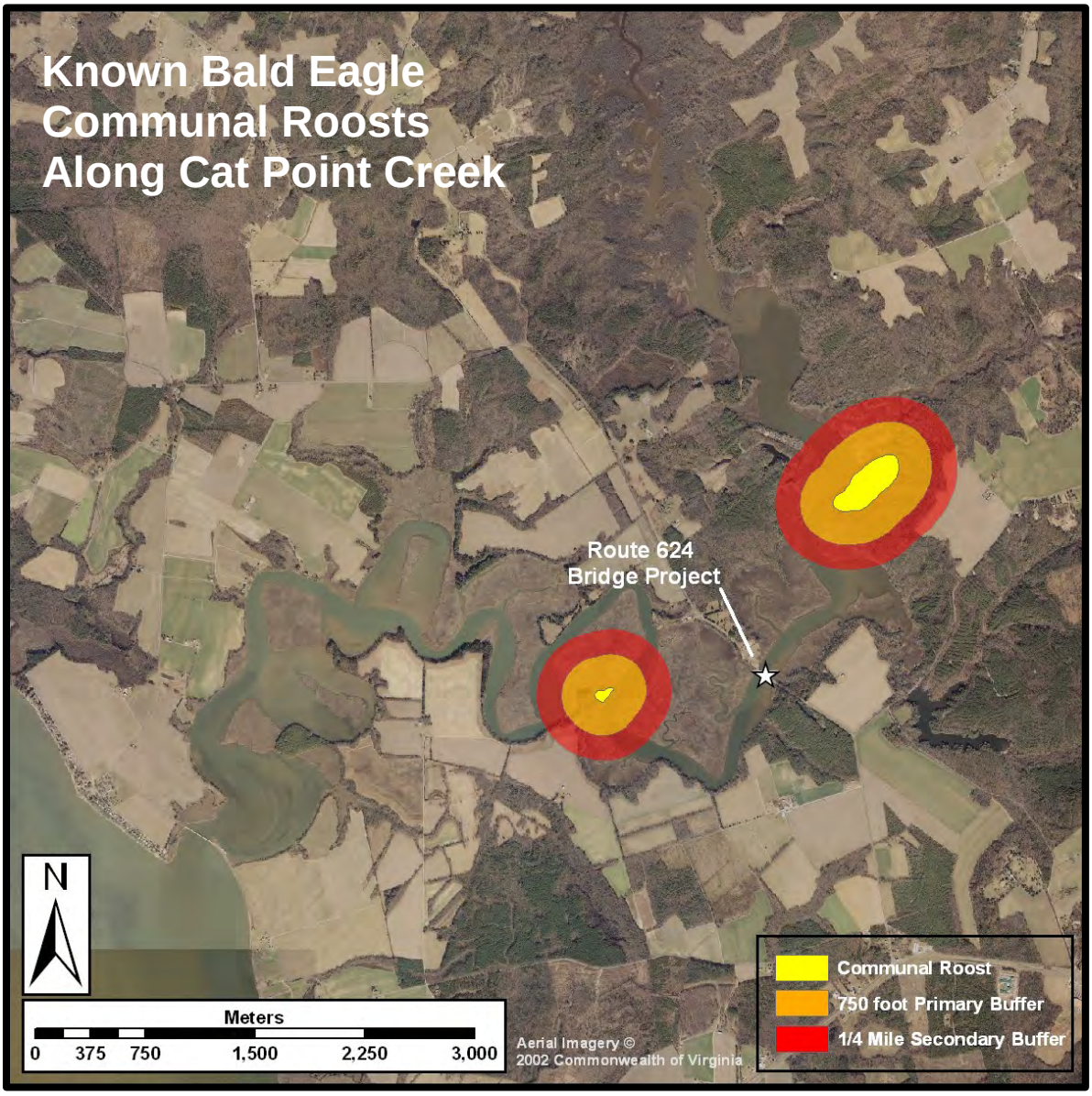


**Figure 4. Locations of known communal roosts along Cat Point Creek with applied management buffers.**

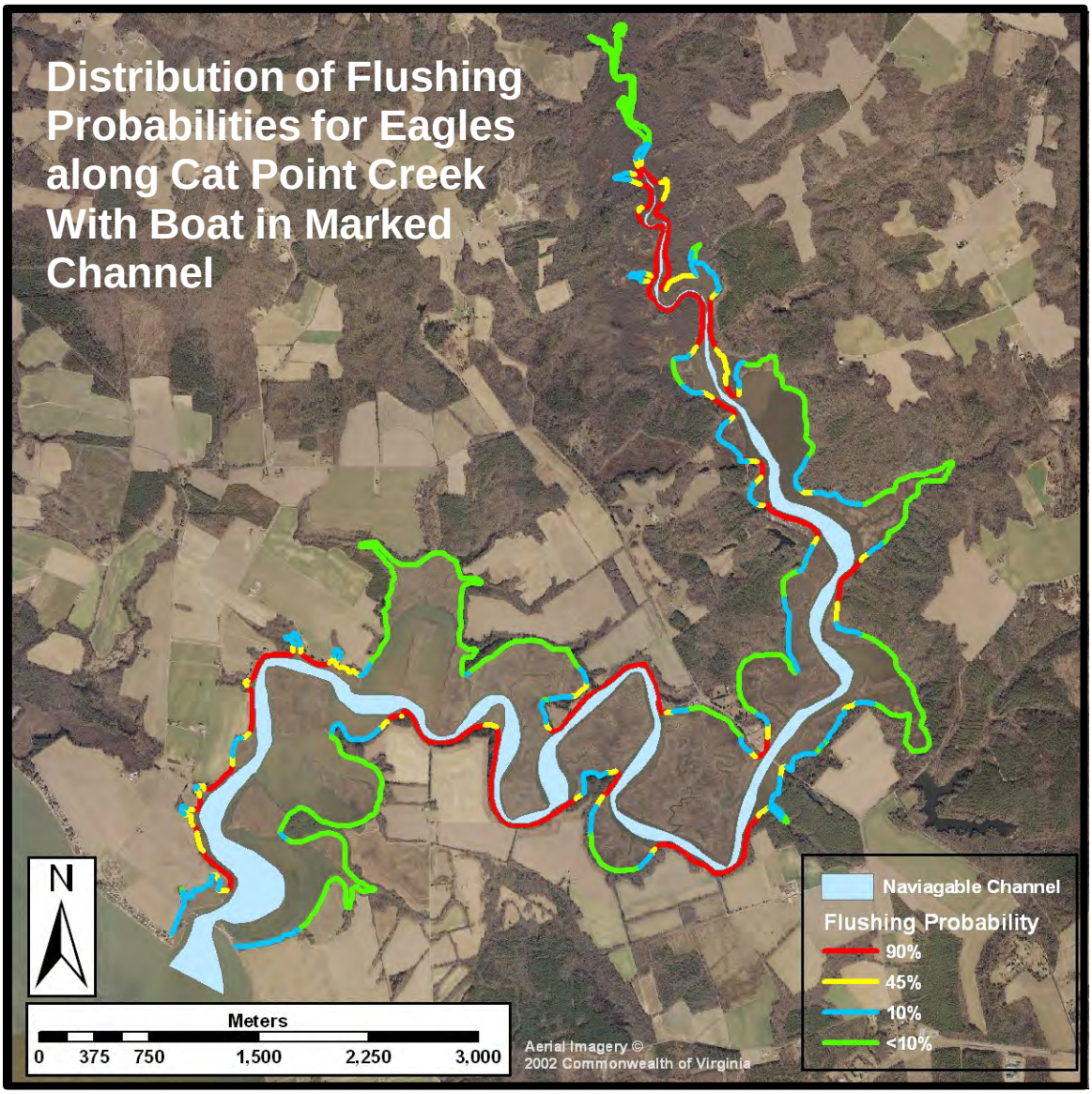


**Figure 5. Distribution of bald eagle flushing probabilities along the aquatic-upland edge from a boat traveling within the marked channel. Flushing probabilities by distance were taken from Watts and Whalen (1997).**